



Caring for adults experiencing homelessness with diabetic foot ulcer: A scoping review

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ABSTRACT

BACKGROUND: The number of people experiencing homelessness (PEH) is rising annually on a global scale. Due to the circumstances of living in this population, they are impacted by health conditions, such as diabetes mellitus (DM) and are susceptible to developing a diabetic foot ulcer (DFU). However, there is still a lack of information about DFU in PEH in the literature.

OBJECTIVE: This scoping review aims to identify and map what is available in the literature on DFU in PEH.

METHODS: The Joanna Briggs Institute and PRISMA-ScR frameworks guided the literature review. The search was conducted in the following databases: MEDLINE, SCOPUS, Web of Science, CINAHL, Scielo, ProQuest, and Google Scholar. Inclusion criteria included articles published between 2014 and 2024 and written in English. Nine articles met the inclusion criteria and were published in six different countries: the United States of America, Canada, Australia, Italy, the United Kingdom and Pakistan.

FINDINGS: The included articles explore the vulnerability of PEHs and how their environment and lifestyle can impact their health, which can be worsened if the PEHs also have a DM diagnosis. The included articles highlighted that PEHs experience inadequate assessment by healthcare professionals and foot exams, which can negatively impact the prognosis of the condition. Prevention, foot exams and volunteer health units are underscored as best practices for PEHs living with DMs to diminish the risk for complications such as DFU as a result of the DM diagnosis. However, the plan of care needs to be individualized and tailored to each person. As well, enhancement to health literacy, for health professionals and PEH, should be promoted for better adherence to treatment and identification of DFU in the early stages.

CONCLUSION: The review identified what is known about DFU in PEH, such as management of DM, comprehensive health care, prevention, foot exams and health literacy. However, this scoping review identified a gap in the literature, expressed by the limited number of articles published on the topic under investigation, which can be improved in the future. It also highlighted that is important to improve healthcare professionals' knowledge to provide health literacy education, conduct a foot exam and evaluate the DM stage. This will help prevent further complications, as well to reach PEH. To assess their health, it is essential to first understand their environment and promote comprehensive care. For this, some volunteer healthcare units in Italy and the US have had great results identifying the risk for or the emergence of DFU and providing targeted and timely treatment.

KEYWORDS: diabetic foot ulcer (DFU), people experiencing homelessness (PEH), scoping review.

The prevalence of homelessness worldwide is difficult to estimate due to the varied definitions by countries across the globe used to describe people living in inadequate housing conditions or without a fixed address (Institute of Global Homelessness [IGH], 2024). However, according to The United Nations (2019, p. 2), homelessness is “a condition where a person or household lacks habitable space with the security of tenure, rights and ability to enjoy social relations, including safety”. This definition is broad and includes different types of homelessness such as living in a temporary shelter, distinguishing from the common belief that homelessness only represents a person who does not have a roof over their head. In 2005, approximately 100 million people were experiencing homelessness, while 1.6 billion people lived in inadequate housing conditions globally (United Nations, 2019). These numbers are almost two decades old, and while current figures are not available, it is safe to state that this number has grown exponentially today.

BACKGROUND

Due to the characteristics of this population, such as unstable housing and low income, people experiencing homelessness (PEH) are exposed to many conditions that can impact their health. According to a study conducted in England, PEH are three times more likely to report having a chronic disease than people who have stable housing (Lewer et al., 2019). However, even though the prevalence of DM is statistically similar between PEH and housed people (Lewer et al., 2019), PEH are susceptible to inadequate management of the disease compared to patients with stable and secure housing in the general population (Asgary, Beideck, & Naderi, 2022).

Diabetes mellitus is a chronic disease characterized by elevated glucose levels in the blood due to insufficient insulin production in the body or ineffective use of the insulin produced by the body (International Diabetes Federation [IDF], 2021). Generally, DM can be managed through pharmacological means and lifestyle modifications, including increasing exercise or physical activity levels, following a nutritious diet, and keeping a healthy body weight (Scobie & Hopkins, 2024; WHO, 2024). However, when patients are unable to control their DM, this can have a potential effect on their blood vessels and nerves, leading to the development of the most common complication of diabetic neuropathy (Scobie & Hopkins, 2024). Even though it is challenging to establish the real incidence of diabetic neuropathy, it is estimated that 50% of diabetic patients will have some level of nerve damage which can contribute to a reduction in quality of life and lead to the development of foot ulceration (Scobie & Hopkins, 2024).

One type of foot ulceration is diabetic foot ulcers (DFU), which can be defined as ulcers that occur as a result of damage to the foot skin structure, from the epidermis to the dermis, of a person who has been or is currently diagnosed with DM (van Netten et al., 2024). Despite the medical factors related to uncontrolled DM, a DFU can occur or be worsened due to non-medical factors such as having limited access to health services and healthy foods, and a low income and education level (Registered Nurses Association of Ontario [RNAO], 2024; Schmidt et al., 2024), as in the case of PEH; however, there is a limited number of studies that explore or have explored this condition in this specific population.

Since there is limited information available about DFU in PEH, and there is inconsistency in reporting or exploring this topic, a scoping review of the literature is

warranted to provide further information for primary healthcare professionals, educators, researchers, and policymakers on how to best support people with these conditions and in such social and economic circumstances.

METHODS

This scoping review follows Joanna Briggs Institute's (JBI) approach and PRISMA-ScR guidelines. This combined method was chosen as this is the gold standard for providing a thorough overview of the topic of interest and a structured identification of gaps in existing literature (Peters et al. 2020).

Review question

The question guiding this review is "What is known in the literature about the care provided to PEH who live with a DFU?"

Inclusion Criteria

Participants

For this study, participants included PEH who had been treated in any healthcare setting.

Concept

The concept of this review is DFU, which can be defined as an ulcer that occurs on the foot as a result of damage to the skin structure of a person diagnosed with DM (van Netten et al., 2024).

Context

The context is the acute care healthcare system and all countries are considered.

Types of Sources

Only studies related to the review question were included. Studies that did not fit the concept or include the participants identified for this review were excluded. To better understand the theme, different study types were included such as case reports, prospective and retrospective studies, qualitative phenomenological studies, and systematic reviews.

Search Strategy

This scoping review aims to analyze empirical and grey literature. The following databases were accessed: MEDLINE via OVID, CINAHL via EBSCOhost, SCOPUS via Elsevier, Web of Science, and Scielo. For grey literature, ProQuest Theses and Dissertations was also used.

To define the search tool, we first looked at keywords on the Medical Subject Headings (MeSH) system. Then, we personalized the search strategy and keywords to each database to obtain articles that could be further reviewed to deem appropriateness for inclusion in this review. To provide an example of a sample search, in CINAHL the search strategy was: "Homeless person" OR "Homelessness" OR "Homeless" OR "Unhoused person" OR "Street people" OR "Houseless" OR "Shelterless people" OR "Transients" OR "Rough sleepers" AND "Leg ulcer" OR "Foot Ulcer" OR "Diabetic foot" OR "Wounds, Chronic". The search was conducted in English and limited to studies published within the last 10 years (2014 to 2024).

Study/Source of Evidence Selection

Following the search, all duplicate articles were removed. Then, the titles and abstracts were read in detail to assess fit for inclusion based on the inclusion and exclusion criteria established. Relevant articles moved on to full-text review.

Data Extraction

For data extraction, a Data Chart was created containing the following headings of information: authors, year of publication, country of publication, aim/purpose/population and sample size (if applicable), methodology/methods, intervention type, comparator and details (if applicable), outcome or conclusion, and key findings that relate to helping us answer the scoping review question.

RESULTS

Selection of Sources of Evidence

The initial database search resulted in 153 articles. After removing 11 duplicates, 142 articles were sequentially screened by title and abstract by two independent reviewers to determine the relevance and applicability to this scoping review's question. This first round of screening resulted in the inclusion of 25 articles that moved on to a full-text review. Out of these, 17 were excluded due to context and concept ineligibility. The search on the Scielo Database ended up with no results; Thus, none of the selected articles were published in any Latin American country. Searching for gray literature using the ProQuest Thesis and Dissertations database, six articles were retrieved that could potentially be included in this review.

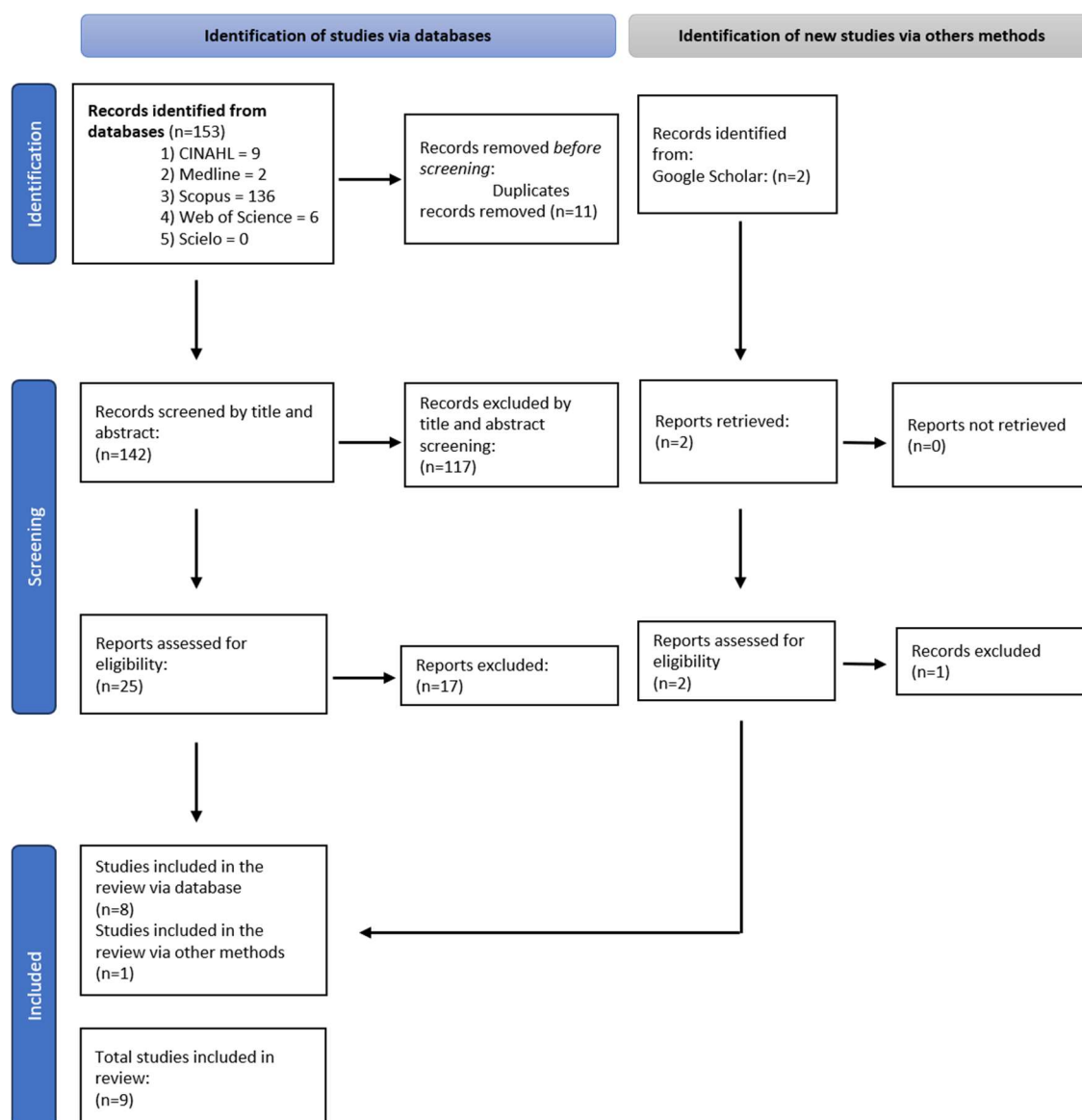
However, after analyzing their titles and abstracts as well as subjecting them to a full-text review, these sources were excluded due to not meeting the inclusion criteria. An additional source was incorporated into the review after a search through Google Scholar. Ultimately, nine studies matched the inclusion criteria and were included in the final scoping review. These are outlined below in the PRISMA flow diagram outline in Figure 1.

Characteristics of Sources of Evidence

The articles included in this scoping review were published between September/October 2015 and 2023. The studies were published in different countries: two studies were published in the United States of America (USA) (Rasul et al., 2022; Wainwright et al., 2019), two were published in Canada (Rickards & Cornish, 2018; To, Brothers, & van Zoost, 2016), one was published in Australia (Mullins et al., 2022), one in Italy (Matteoli et al., 2015), one in the United Kingdom (UK) (Hurrell, 2023) and one in Pakistan (Ebied & Eldardery, 2021). Only one grey piece of literature attended to the inclusion criteria and was published in the USA (Strout, 2019).

The findings of this scoping review were categorized into the following categories: 1. DM and DFU in PEH; 2. Cost of Intervention X Cost of Prevention; 3. Volunteer Health Units and Foot Exams; and 4. Health Literacy.

Figure 1. PRISMA flow diagram.



Diabetes Management and DFU in PEH

Several included sources have outlined how being homeless impacts the health of the foot and how this can be further complicated if the PEH has DM (Hurrel, 2023; Matteolli et al., 2015; Mullins et al., 2022; Rasul, 2022; To, Brothers, & Van Zoost, 2016; Wainwright, 2019). PEH have inadequate management of DM, usually related to their diet, lack of access to medications, and alcohol/substance consumption which can increase the incidence of DFUs. In addition, two studies revealed that PEH usually wear the wrong size of shoes and have inadequate foot hygiene leading to skin and nail pathologies, impacting their foot health (Mullins et al., 2022; To, Brothers, & Van Zoost, 2016). Furthermore, Hurrel (2023) has pointed out that bio-psycho and social problems can impact their health as well, such as mental health problems or addiction issues. Wainwright et al. (2019) found that loneliness and isolation can affect their well-being, while Mullins et al. (2022) suggested that reaching and intervening in foot problems of PEH can be a simple pathway to build connections

between this population and the healthcare system, improving their access to other health services and comprehensively treating them.

Considering this, for better assistance to PEH, Rasul et al. (2022) demonstrated that it is necessary to understand the living environment of the PEH to design adequate management plans for their DM and prevent the development of DFUs. Corroborating with this, a qualitative study by Ebied and Eldardery (2021) revealed that elderly PEH, specifically women, experience a lot of physical, social and psychological problems as a result of poverty, the street environment, lack of access to health care and long-term complications of their chronic disease. Hurrell (2023) pointed out that a multidisciplinary approach is required to achieve a better pathway and prognosis for PEH with DFU, and that the care needs to be specific to each person due to the unique and multifaceted ways that homelessness can manifest.

Prevention and Early Management of DFU

One of the included sources (Rasul et al., 2022) revolved around a case of a 41-year-old PEH who had uncontrolled DM type 1 and attended a “foot-washing” volunteer event in a low-income neighbourhood. After examining his foot, the volunteers found two wounds on his feet and one in his anterior middle shin. The case concluded with the PEH undergoing an amputation of his right second and third toes and a hospitalization that lasted approximately one month due to developed complications and rehabilitation needs. Apart from other health and social problems that can contribute to the occurrence of DFU, such as substance abuse and hypertension, the authors pointed out that DFU occurs due to a lack of access to appropriate equipment such as insulin, syringes, and blood glucose monitors, due to the limited financial means to afford such equipment being a PEH. Ebied and Eldardery (2021) produced a similar finding through the dissemination of cases of PEHs who underwent leg amputations due to them having a lack of access whether through physical or financial means to appropriate medication and equipment resulting in uncontrolled DM.

The outcomes of the above cases could have been worse, leading to sepsis and loss of life, even though living with amputation in this context also now requires significant life adjustments and adaptations. The key issue is prevention and such situations could have been prevented with the availability of timely and proper treatment and management of PEH's DM, ultimately contributing to a reduction in healthcare spending and the presence of life-threatening risks.

Matteoli et al. (2015) also showed that to resolve a DFU on average approximately 14 to 18 interventions are required per person. Even with weekly medication treatment, it can take 12 to 17.6 months to ‘heal’ a chronic wound such as a DFU. In their study, the researchers demonstrated clinically significant improvement in 18 of their 21 patients with a DFU, representing an 86% healing success rate. However, two patients did require an amputation and one died of septic shock and kidney failure after two-foot amputations and one application of negative pressure.

Although evidence shows that prevention of DFU costs less, both financially and in terms of human health and wellbeing, there does not seem to be a priority focus on such prevention, especially in PEHs. This can be seen with the limited availability and access to diabetic foot exams that are used to detect potential future issues in patients.

Volunteer Health Units and Foot Exams

Some volunteer health units had great results identifying uncontrolled DM and DFUs as well as treating PEH (Matteoli et al., 2015; Rasul et al., 2022). Matteoli et al. (2015) also showed that a mobile healthcare unit can be a good way to reach this population and improve their access to public health services.

Furthermore, Rasul et al. (2022) pointed out that a “foot-washing” volunteer event was able to identify cutaneous manifestations of DM through a skin assessment of PEHs and that such engagement programs are effective in preventing risk situations related to the development of DFUs. Even though a diabetic foot exam is a low cost in comparison to other intervention-based assessments, Wainwright et al. (2019) found that the adherence to or acceptance of diabetic foot exam was low in PEH in the two analyzed locations of their study which included the Federal Qualified Health Center (FQHC) and shelters. This finding is of great significance as PEHs typically seek assistance and care in shelters they regularly visit. So, the causes of the low utilization and interest in receiving a diabetic foot exam warrant further exploration.

Health Literacy

According to WHO (2024, para. 2), health literacy “represents the personal knowledge and competences that accumulate through daily activities, social interactions and across generations”, allowing individuals to access, understand and apply information and services effectively to promote personal and community health.

Health literacy, in this context, needs to be considered for both groups of people: the healthcare professionals serving or providing care to PEHs and the PEHs themselves. Two included articles discussed that PEHs do not have enough knowledge of their diagnosis(es). Particularly, when the DFU is accompanied by diabetic neuropathy, the PEH can not often feel the DFU, delaying seeking appropriate healthcare services and support (Hurrel, 2023; Rasul et al., 2022). Health literacy is an important tool for preventing and identifying a DFU in the early stages, and it can also improve treatment adherence.

For healthcare professionals, when it is not feasible to conduct extensive glucose testing to evaluate DM on PEH, relying on a physical assessment of the skin condition can be an effective and low-cost method to identify DM progression, since this chronic disease can result in cutaneous manifestations (Rasul et al., 2022), but this requires knowledge and experience. Also, healthcare professionals need to enhance their knowledge, education, and practices when providing services and care to PEHs with DFUs that are inclusive of understanding their unique context, circumstances and how to best support them (Hurrel, 2023).

In agreement with this, Rickards and Cornish (2018) found that only a few low-income seniors included in their research had been assessed in a specialized clinic for DM education. Most of them did not receive orientation about this service, so they were not aware that it existed, impacting their search for specialized treatment. Additionally, they emphasized that when healthcare professionals take some time to discuss the DFU, it has a positive impact on the patient's initiative toward self-management and knowledge.

Strout (2019) noted similar results with a sample of 20 participants who completed a four-week intervention demonstrating 100% of the participants had not received diabetic foot care education in the past 12 months, and 90% of these participants had not had a foot exam. This study evaluated the benefits of an educational intervention on self-management of the DFU of PEH led by registered nurses. The results demonstrated that teaching PEH how to manage DM positively impacted preventing DFU and improving treatment. This is due to PEH starting to engage in diabetic foot self-care behaviours with the most common behaviour being checking one's own feet and looking at one's shoes, while also learning about other types of self-care behaviors.

LIMITATIONS

One limitation of this scoping review is the number of articles included since there is very limited literature available on this topic. As well, some of the studies included did not have the main topic of the article being DFU in PEH. However, this topic did appear as a secondary article/study focus and hence those articles warranted inclusion in the scoping review.

IMPLICATIONS

This scoping review gave a brief view of and highlighted a gap in the literature on DFU in PEH. Further exploration is warranted in this subject area through future qualitative studies to learn more about the experiences of PEH living with DFUs. Also, some quantitative studies can be conducted to estimate the costs of treating or preventing DFU in PEH. Such research studies can then be used to inform healthcare delivery to this population as well as the development of targeted health promotion plans to work with PEH to prevent the occurrence of DM and DFUs in the first place.

For healthcare professionals, the findings of this scoping review substantiated the necessity to improve the health literacy of PEH who live with DFU as this can support the advancement of their self-management capabilities. This can be done during nursing assessments, as an example. In addition, it is vital to also reinforce the importance of conducting foot exams in this population as well as to evaluate the DM stage to prevent more difficult-to-solve complications from developing, such as the DFUs. For this, continuing education of healthcare professionals is of high significance on how to reach this and other vulnerable populations to provide timely, responsive, and preventive care.

For policy makers, findings of this scoping review underscore the significance of developing policies that provide guidance on how to deliver care to vulnerable and hard-to-reach populations, ensure this care is timely so that it can take more of a health promotion and preventative approach versus attempting to address an already developed complication, and reduce healthcare spending.

CONCLUSION

This scoping review provides a comprehensive overview of the DFU in PEH. PEH face difficulties related to the management of DM and are more susceptible to developing a DFU due to their specific circumstances of living and lack of access to the health system. DFU impacts their health negatively leading to a potential amputation and hospitalization.

Health literacy is an important concept to consider when advocating for empowering this population to engage in self-care and management of DFU. Health literacy assessment by health professionals may be one strategy in performing and delivering comprehensive care to reduce risk of a PEH in developing a DFU.

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